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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/055,608	01/23/2002	Wolfgang Singer	637.0017USU	6642

7590 12/15/2004

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EXAMINER

PRITCHETT, JOSHUA L

ART UNIT	PAPER NUMBER
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2872

DATE MAILED: 12/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/055,608	Applicant(s) SINGER ET AL.	
	Examiner Joshua L Pritchett	Art Unit 2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 September 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 26-41, 43-73 and 75-78 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 52-73 and 76 is/are allowed.
- 6) ☒ Claim(s) 26-28, 31-33, 37, 41-48, 50, 51, 75, 77 and 78 is/are rejected.
- 7) ☒ Claim(s) 29, 30, 34-36, 38-40 and 49 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9-04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This action is in response to Amendment filed September 24, 2004. Claims 26, 75, 77 and 78 have been amended and claims 42 and 74 have been cancelled as requested by the applicant.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 26-28, 31-33, 37, 41 and 43 are rejected under 35 U.S.C. 102(b) as being anticipated by Murtha (US 5,002,379).

Claims 26-28, 31-33, 37, 41 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murtha (US 5,002,379) in view of Chapman (US 6,186,632).

Regarding claim 26, Murtha discloses a collector comprising a first mirror shell for receiving a first ring aperture section of the light and the irradiating a first planar ring section of the plane with a first irradiance (Fig. 20), a second mirror shell for receiving a second ring aperture section of the light and the irradiating a second planar ring section of the plane with a second irradiance (Fig. 20). Murtha further discloses the first and second ring aperture sections

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do not overlap with one another (Fig. 19). Murtha further discloses the first planar ring section substantially abuts the second planar ring section (Fig. 18). Murtha further discloses the first irradiance is approximately equal to the second irradiance and the collector has a focal point (Fig. 20). Fig. 20 shows only one means of illumination and the first and second mirror shells have the same reflective power. Therefore the first and second irradiance are approximately equal. Murtha lacks reference to the light impinging at an angle of incident of less than 20 degrees to the surface tangent. Chapman teaches the light impinging at an incident angle of less than 20 degrees of the surface tangent of the first and second mirror shells (col. 6 line 66 – col. 7 line 2). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the Murtha invention have the incident angle as taught by Chapman for the purpose of minimizing the amount of light lost at the reflection surface and maintain the propagation of the light along the optical train.

Regarding claim 27, Murtha discloses the first and second mirror shells have dimensions that are different from one another in a direction of the axis of rotation (Fig. 19).

Regarding claim 28, Murtha discloses the first mirror shell is an inner mirror shell and the second mirror shell is an outer mirror shell (Fig. 19). Murtha further discloses the outer mirror shell is further distant from the plane than the position of the inner mirror shell based on a mean value of an initial and end point with regards to the axis of rotation for each mirror shell.

Regarding claim 31, Murtha discloses the first and second planar ring sections have radial dimensions of equal size (Fig. 18), the first and second planar ring sections are concentric (Fig. 18), the first planar ring section is an inner planar ring section and the second planar ring section is an outer planar ring section (Fig. 18), the first and second mirror shells have a dimension in the

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direction of the axis of rotation (Fig. 19), the dimension of the first mirror shell is larger than the dimension of the second mirror shell (Fig. 20).

Regarding claim 32, Murtha discloses the first and second mirror shells are each a ring-shaped segment of an aspherical object (Fig. 19).

Regarding claim 33 Murtha discloses the first and second mirror shells are a ring-shaped segment of a hyperboloid (abstract).

Regarding claim 37, Murtha discloses the first and second ring aperture segments are separated by a gap (Fig. 20).

Regarding claim 41, Murtha discloses wherein the first and second mirror shells are two of a plurality of at least three mirror shells (Fig. 18).

Regarding claim 43, Murtha discloses an illumination system comprising the collector (Fig. 20).

Claims 44-48, 50, 51, 75, 77 and 78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murtha in view of Chapman as applied to claim 26 above, and further in view of Sandstrom (US 6,624,878).

Regarding claims 44, 45 and 78, Murtha teaches the invention as claimed but lacks reference to the use of raster elements. Sandstrom teaches the use of raster elements in EUV lithography (col. 5 lines 25-36). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the Murtha collector contain the raster elements taught by Sandstrom for the purpose of providing extra versatility to the EUV lithography design.

Regarding claim 46, Murtha teaches the invention as claimed but lacks reference to the use of using the collector in the claimed illumination system. Chapman teaches the illumination system has a second optical element for imaging (Fig. 6, 610). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the Murtha nested collector in an illumination system as taught by Chapman for the purpose of efficiently directing extreme ultraviolet light onto a lithography wafer.

Regarding claim 47, Murtha teaches the invention as claimed but lacks reference to the use of using the collector in the claimed illumination system. Chapman teaches the second optical element is used for field shaping (col. 7 lines 7-8). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the Murtha nested collector in an illumination system as taught by Chapman for the purpose of efficiently directing extreme ultraviolet light onto a lithography wafer.

Regarding claims 48, 75 and 77, Murtha teaches the invention as claimed but lacks reference to the use of using the collector in the claimed illumination system. Chapman discloses an illumination system wherein the system comprises a second plan conjugated to the light source between the collector and the first plane in which an intermediate image of the light source is formed (Fig. 6, 610). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the Murtha nested collector in an illumination system as taught by Chapman for the purpose of efficiently directing extreme ultraviolet light onto a lithography wafer.

Regarding claim 50, Murtha teaches the invention as claimed but lacks reference to the use of using the collector in the claimed illumination system. Chapman discloses an EUV

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projection system with a mask and a projection objective (col. 4 lines 33-45). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the Murtha nested collector in an illumination system as taught by Chapman for the purpose of efficiently directing extreme ultraviolet light onto a lithography wafer.

Regarding claim 51, Murtha teaches the invention as claimed but lacks reference to the use of using the collector in the claimed illumination system. Chapman discloses a process for producing a microelectronic device comprising EUV projection exposure (col. 4 lines 33-45). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the Murtha nested collector in an illumination system as taught by Chapman for the purpose of efficiently directing extreme ultraviolet light onto a lithography wafer.

Allowable Subject Matter

Claims 52-73 and 76 are allowed.

The following is an examiner's statement of reasons for allowance:

Regarding claim 73, the prior art of record fails to teach or suggest the use of a diaphragm near an intermediate image separating the light source and the collector from a portion of the illumination system.

Regarding claim 76, the prior art of record fails to teach or suggest the nested collected having a central aperture with a numerical aperture of less than or equal to 0.30.

Claims 52-72 are allowable for reasons discussed in the previous office actions.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Claims 29, 30, 34-36, 38-40 and 49 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the reasons for indicating allowable subject matter as the same as provided in the previous office actions.

Response to Arguments

Applicant's arguments, see Amendment, filed September 24, 2004, with respect to the rejection(s) of claim(s) 26, 75, 77 and 78 under Murtha have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration of the newly amended claim limitations, a new ground(s) of rejection is made in view of Murtha in view of Chapman.

Conclusion

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Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joshua L Pritchett whose telephone number is 571-272-2318. The examiner can normally be reached on Monday - Friday 7:00 - 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew A Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JLP *JP*



DREW A. DUNN
SUPERVISORY PATENT EXAMINER